CHAPTER 7

DATA MANAGEMENT-COMPUTERIZED PAVER SYSTEM

7-1. Purpose

a. Computerized data management. The manual data management system described in chapter 6 is a systematic way of recording and storing information needed for effective pavement maintenance management. However, for medium to large-sized installations, the number of record cards can increase to the point where it is very time consuming to manually search, sort, and compile information for various maintenance management applications. An optional computerized system is available to automatically perform data retrieval, sorting, and compilation. In addition, the computer may be used to perform a number of calculations that in a manual system would have to be accomplished manually.

b. Description of system. This chapter briefly describes the computerized PAVER system. Specific user instructions may be obtained from the assigned responsible agency-the US Army Facilities Engineering Support Agency (USAFESA), Fort Belvoir, VA 22060.

7-2. Use of computerized PAVER

Generally, the computerized system is recommended for expediency of data handling and report generation. It may become advantageous to use it for pavement networks with a large number of pavement sections (more than 200). However, if the choice of system is not clear-cut, it is always possible to set up a manual system and then later convert to a computerized system.

7-3. System description

PAVER is operated via a desk-top computer terminal normally located in the Buildings and Grounds Division of the Facilities Engineering Organization. This terminal sends and receives information from a central computer via standard telephone lines. The user stores information about the pavement network in the computer by typing in data on the terminal or by having data keypunched and read in through a card reader. The user retrieves information from the computer by typing in commands which cause various options of reports to be printed on the terminal. Reports may be produced interactively (instantly) or in batch (retrieved at a later time). A brief description and the possible use of each automated system report, including content and use, is contained in appendix D.

a. PAVER data input/update forms. The data stored in the computer is virtually the same as that recorded on the record cards of the manual system. To make this data machine-readable, special input/update forms are used. By using an ADD/CHANGE/DELETE code, each input form can be used to store new information in the computer or to make changes or deletions to information that has already been stored. An outstanding feature of the PAVER input/update program is that the PCI and extrapolated distress data for the pavement section are computed as the condition survey data are input or revised.

b. PAVER report outputs. There are two types of PAVER reports: the writer reports and the computation reports.

(1) Writer reports. Writer reports are preformatted reports generated by the PAVER Data Base Manager feature called the report writer, which sorts through PAVER stored information to meet specific user requirements at the time of report generation. There are several such reports available, including those for generating inspection results, pavement inventory, pavement structure, work required, and work completed history. An example of a pavement inspection report is shown in figure 7-1. An example of pavement ranking in an increasing order of PCI is shown in figure 7-2.

(2) Computation reports. Computation reports are special reports that require further processing (computations) of the data stored in PAVER and/ or new data provided by the user. One of the currently available reports develops routine M&R requirements based on stored pavement distress data and the engineer maintenance policy (which can be stored in PAVER). An example output is shown in figure 7-3. Another available report computes the present worth of any M&R alternative using the economic analysis procedure presented in chapter 5. An example output is shown in figure 7-4. Other computation reports can be developed as needed.

REPORT DATE- 02/02/81

PAVEMENT INSPECTION
FORT EUSTIS

BRANCH NAME - DICKMAN STREET
BRANCH NUMBER - IDICK
SECTION NUMBER - 01
SECTION LENGTH - 414 LF
SECTION WIDTH - 21 LF
SECTION AREA - 966 SY

INSPECTION DATE - 12/03/79 PCI= 53 RATING= FAIR
CONDITION- RIDING-C1 SAFETY-C1 DRAINAGE-C1 SHOULDERS-C1 OVERALL-C1

TOTAL NUMBER OF SAMPLES IN SECTION= 4
NUMBER OF SAMPLES SURVEYED= 4
RECOMMEND ALL SAMPLE UNITS TO BE SURVEYED.

EXTRAPOLATED DISTRESS QUANTITIES FOR SECTION-

DISTRESS TYPE	SEVERITY	QUANTITY	DENSITY-PCT	DEDUCT-VALUE
ALLIGATOR CR	HIGH	15 SF	0.17	14.2
ALLIGATOR CR	LOW	680 SF	7.82	29.5
ALLIGATOR CR	MEDIUM	60 SF	0.69	17.7
BLEEDING	LOW	8 LF	0.09	0.0
DEPRESSION	LOW	18 SF	0.20	4.0
EDGE CR	HIGH	4 LF	0.04	7.4
LONG/TRANS CR	LOW	287 LF	3.30	7.6
PATCH/UTIL CUT	LOW	100 SF	1.15	2.4
PATCH/UTIL CUT	MEDIUM	50 SF	0.57	7.0
POTHOLE	HIGH	4 NMBR	0.04	40.2
RUTTING	LOW	10 SF	0.11	1.0

Figure 7-1. Example of inspection report.

REPORT DATE- 07/05/82 **PCI REPORT**

INSTALLATION NUMBER = 051215 FORT EUSTIS

BRANCH NUMBER	BRANCH USE	SECTION NUMBER	PCI	RATING	SURFACE TYPE	SECTION AREA/SY	PAVEMENT RANK
IMONR	ROADWAY	01	50	FAIR	AC	608	TERTIARY
	11/27/79	[FROM] NR BLDG 832			[TO]	W EDGE LUCAS PL	
IBUTN	ROADWAY	02	52	FAIR	AC	392	TERTIARY
	11/08/79	[FROM] E EDGE PATTON AVE			[TO]	W EDGE PERSHING AVE	
IMULB	ROADWAY	04	52	FAIR	AC	1683	TERTIARY
	02/20/80	[FROM] NR BLDG 3905			[TO]	END OF PAVEMENT	
I12ST	ROADWAY	03	52	FAIR	AC	399	TERTIARY
	02/11/81	[FROM] E'LY EDGE PATTON			[TO]	W'LY EDGE LEE BLVD	
IDICK	ROADWAY	01	53	FAIR	AC	966	TERTIARY
	12/03/79	[FROM] S EDGE LEE BLVD			[TO]	N EDGE TYLER AVE	
IREIN	ROADWAY	01	53	FAIR	AC	694	TERTIARY
	02/11/81	[FROM] E'LY EDGE MADISON			[TO]	W'LY EDGE WILSON LN	
IMONR	ROADWAY	05	54	FAIR	PCC	1622	SECONDARY
	12/05/79	[FROM] S EDGE TAYLOR AVE			[TO]	N EDGE BUNDY ST	
IWILN	ROADWAY	01	55	FAIR	AC	1670	TERTIARY
	11/29/79	[FROM] PERSHING AVE			[TO]	JUST BEYOND JURASIN	
IBACK	ROADWAY	01	56	GOOD	AC	5155	TERTIARY
	02/04/80	[FROM] E EDGE HARRISON RD			[TO]	W EDGE MULBRY IS RD	
ISKIF	ROADWAY	01	56	GOOD	PCC	1391	TERTIARY
	01/12/82	[FROM] BLDG 408			[TO]	BLDG 414	
ITINC	ROADWAY	01	56	GOOD	AC	3068	TERTIARY
	01/09/80	[FROM] W ED MADI BLDG 2783			[TO]	TINC02 BLDG 2798	
IMULB	ROADWAY	02	57	GOOD	AC	12551	PRIMARY
	02/20/80	[FROM] N EDGE WILSON BLVD			[TO]	ENTR PINES GOLF CLUB	
IKELL	ROADWAY	01	58	GOOD	AC	3378	TERTIARY
	10/30/79	[FROM] S'LY EDGE MONROE			[TO]	ROD & GUN CLUB	
I06ST	ROADWAY	01	58	GOOD	AC	2020	TERTIARY
	11/09/79	[FROM] E'LE EDGE BULLARD			[TO]	W'LY EDGE JACKSON	
IWRIG	ROADWAY	01	60	GOOD	PCC	1371	TERTIARY
	10/18/79	[FROM] E'LY EDGE WASH NO			[TO]	W'LY EDGE WALKER ST	
IKERR	ROADWAY	01	63	GOOD	AC	4897	TERTIARY
	01/16/80	[FROM] N'LY EDGE LEE BLVD			[TO]	BLDG 425 3RD PORT	

Figure 7-2. Example of pavement ranking in an increasing order of PCI.

392-550 0 - 83 - 5 : QL 3

REPORT DATE - 81/02/02.

MAINTENANCE AND REPAIR GUIDELINES

BRANCH NAME - DICKMAN STREET
BRANCH NMBR - IDICK
SECTION NMBR - 01

SECTION LENGTH - 414 LF
SECTION WIDTH - 21 LF
SECTION AREA - 966 SY

INSPECTION DATE - 12/03/79

SECTION PCI - 53

DISTRESS TYPE	DIS SEV	DIST-QTY WORK-QTY	WORK TYPE	MATL CODE	LABOR HOURS	LABOR COST$	MAT'L COST$	EQUIP COST$	TOTAL COST$
ALLIGATOR CR	L	680 SF							
		680 SF	SEAL COATING	155	0.0	0	0	0	67
ALLIGATOR CR	M	60 SF							
		60 SF	SHALLOW PATCH	120	30.0	360	11	66	468
ALLIGATOR CR	H	15 SF							
		15 SF	DEEP PATCH	120	12.0	135	5	26	167
BLEEDING	L	8 LF							
			--- NO MAINTENANCE POLICY AVAILABLE ---						
DEPRESSION	L	18 SF							
			--- NO MAINTENANCE POLICY AVAILABLE ---						
EDGE CR	H	4 LF							
		6 SF	SHALLOW PATCH	120	0.0	0	0	0	43
LONG/TRANS CR	L	287 LF							
			--- NO MAINTENANCE POLICY AVAILABLE ---						
PATCH/UTIL CUT	L	100 SF							
			--- NO MAINTENANCE POLICY AVAILABLE ---						
PATCH/UTIL CUT	M	50 SF							
		50 LF	CRACK FILLING	171	0.0	0	0	0	32
POTHOLE	H	4 NMBR							
		4 EA	DEEP PATCH	120	16.0	192	8	35	224
RUTTING	L	10 SF							
			--- NO MAINTENANCE POLICY AVAILABLE ---						
			TOTAL		58.0	687	24	127	1001

Figure 7-3. Example of M&R requirements report.

REPORT DATE - 80/12/19.

COMPARISON OF M&R ALTERNATIVES
CENTRAL AVE
SECTION 01

INFLATION RATE 6.00 PERCENT
ANALYSIS PERIOD - 20 YEARS INTEREST RATE 10.00 PERCENT

ALTERNATIVE	DESCRIPTION	NET PRESENT COST
B	PATCH JOINTS AND OVERLAY WITH 2 IN AC	28858.
A	CONTINUE JOINT PATCHING AND SLAB REPLACEMENT	36842.
C	RECONSTRUCT WITH CONCRETE	50642.

DETAILED COMPARISON OF M&R ALTERNATIVES

YEAR	ALT A COST	ALT A PRES COST	ALT B COST	ALT B PRES COST	ALT C COST	ALT C PRES COST
0 (FY80)	14410	14410	20410	20410	46000	46000
1 (FY81)	0	0	0	0	0	0
2 (FY82)	0	0	0	0	0	0
3 (FY83)	0	0	0	0	0	0
4 (FY84)	0	0	0	0	0	0
5 (FY85)	7610	6323	1000	830	0	0
6 (FY86)	0	0	0	0	0	0
7 (FY87)	0	0	0	0	0	0
8 (FY88)	0	0	0	0	0	0
9 (FY89)	0	0	0	0	0	0
10 (FY90)	7610	5254	1500	1035	1200	828
11 (FY91)	0	0	0	0	0	0
12 (FY92)	0	0	0	0	0	0
13 (FY93)	0	0	0	0	0	0
14 (FY94)	0	0	0	0	0	0
15 (FY95)	7610	4365	1500	860	0	0
16 (FY96)	0	0	0	0	0	0
17 (FY97)	0	0	0	0	0	0
18 (FY98)	0	0	0	0	0	0
19 (FY99)	0	0	0	0	0	0
20 (FY00)	13610	6488	12000	5720	8000	3813
TOTAL	50850	36841	36410	28857	55200	50642
SALVAGE	0	0	0	0	0	0
PRES WORTH		36841		28857		50642

Figure 7-4. Example of economic analysis report.

7-4. System use and update

PAVER should be used and updated in a manner similar to the manual system. Some of the computer reports can be used as an aid in scheduling work for the pavement maintenance crew or to generate work to be done by contract. Other reports can be used to communicate pavement condition and maintenance requirements to higher management. PAVER will automatically delete the corresponding project from the pavement work plan and will store the work in completed projects as work history, thereby capturing the history of the distresses, repairs, quantities, and associated cost.

a. Pavement inspection information. As pavement sections are inspected, information should be input to PAVER; PAVER will not delete the results from any previous inspection of the section unless specifically required to do so by the user. Therefore, pavement condition information showing a condition profile over a period of time will be readily available.

b. Work requirements. Work requirements are determined as shown in figure 4-9. However, PAVER can expedite this process considerably. For those sections where existing maintenance policy is to continue (usually the majority of sections in a pavement network), work requirements can be automatically developed by PAVER based on user maintenance policy and distress results of pavement inspections. For pavement sections where economic analysis is desirable to compare several M&R alternatives, PAVER can be used to perform the computations.

c. Incorporation of improvements. It should be noted that PAVER has been designed so new technological procedures/improvements can be incorporated into it as they become available.